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The Occurrence of Lymphocystis in a New Host Species, *Sargocentron punctatissimum* Cuvier and Valenciennes, Collected and Maintained in Hawaii[1]

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ABSTRACT: Seven specimens of squirrelfish, *Sargocentron punctatissimum* Cuvier and Valenciennes, collected from Allen Davis Beach Park, Oahu, Hawaii, developed lymphocystis lesions while being maintained at the Waikiki Aquarium. Four other reef fish species collected and held with the squirrelfish did not develop lymphocystis disease. This is the first documentation of lymphocystis from a member of the Holocentridae from Pacific waters and the second report of lymphocystis from a marine fish species collected in Hawaiian waters.

LYMPHOCYSTIS IS A chronic viral disease of fishes characterized by the presence of nodules on the fins and skin. Infection by lymphocystis virus is rarely fatal. Affected fish may appear grossly disfigured and become unsuitable for public aquarium display.

Lymphocystis disease is caused by an icosahedral-shaped DNA virus in the family Iridoviriidae. Lymphocystis virus localizes in connective tissue cells. Infected cells become tremendously hypertrophied, forming grossly observable nodules. Lymphocystis virions have an average diameter of 250 nm (Post 1983).

Lymphocystis disease has been recorded from at least 96 fish species collected over a wide geographical area (Lawler and Ogle 1977, Nigrelli and Ruggieri 1965). This paper reports the occurrence of lymphocystis in a group of squirrelfish, *Sargocentron punctatissimum* Cuvier and Valenciennes, collected and maintained in Hawaii. Definitive diagnosis of lymphocystis virus infection was confirmed by histopathology and electron microscopic demonstration of the characteristic lymphocystis virions.

MATERIALS AND METHODS

On 8 March 1985, 11 fish representing 5 species [*Sargocentron punctatissimum* (7 specimens), *Canthigaster jactator* (Jenkins) (1 specimen), *Gymnothorax* sp. (1 specimen), *Pervagor spilosoma* (Lay and Bennett) (1 specimen), and *Zanclus cornutus* Linnaeus (1 specimen)] were collected in the nearshore waters at Allen Davis Beach Park, Oahu, Hawaii. These specimens were donated to the Waikiki Aquarium Live Exhibits Department on 25 March 1985.

Upon receipt, the 11 specimens were isolated in a 57-liter fiberglass aquarium with a Plexiglas front for observation. Water exchange was maintained by flowthrough, and temperature remained approx. 24°C. The specimens were given a routine preventative treatment for bacteria and ectoparasites. Fish were fed a prepared ration formulated by the Waikiki Aquarium nutrition staff. The squirrelfish were maintained in this manner until 26 April 1985, when they were all euthanized for necropsy examination.

Tissues from each fish were collected and preserved in neutral, 10% buffered formalin.

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Selected tissue sections were stained for routine histopathology with hematoxylin and eosin, or by a Feulgen method (Humason 1979).

Sections of skin nodules were preserved and stored in 6%, cold (4°C) glutaraldehyde in a modified 0.15 M Millonig's phosphate buffer solution with 0.5% sucrose. Thin sections were then stained with uranyl acetate and lead citrate for examination with an RCA EMU 4A electron microscope.

RESULTS AND DISCUSSION

Seventeen days after collection, several *Sargocentron punctatissimum* were noted to have nodular lesions on the fins. During the following 30-day period of observation, all seven *S. punctatissimum* eventually developed nodules on the fins or skin. Fin or skin lesions did not occur on any of the other four species of fish. This suggests these other species were not susceptible to infection by this strain of lymphocystis virus. Lymphocystis virus is reported to be relatively host-specific (Wolf 1968). However, although rare, transmission between species has been reported (McCosker and Nigrelli 1971).

The lesions on the *Sargocentron punctatissimum* appeared as solitary to confluent white-colored nodules ranging in size from 1 to 15 mm (Figure 1). All seven of the squirrelfish had nodules on the dorsal fin. Nodules were present on the caudal, anal, and right pectoral fins of six of the seven specimens. Lesions were noted less frequently on other body locations in these squirrelfish. Nodules or other pathological changes were not observed during gross internal or histopathological examination of the seven *S. punctatissimum* specimens.

Microscopically, nodules were made up of tremendously enlarged, presumed connective tissue cells (Figure 2). Affected cells were characterized by an indistinct nucleus, granular cytoplasm, and one or more basophilic, Feulgen-positive cytoplasmic inclusions. Ultrastructurally, numerous icosahedral virions (Figure 3) were found in the cytoplasm of the hypertrophied cells. Average virion diameter was 234 nm. These microscopic findings established the nodules as being caused by lymphocystis virus.

Lymphocystis has been reported in *Forcipiger longirostris* (Broussonet), family Chaetodontidae, collected from Hawaii and maintained for a period of time at the New York Aquarium (Nigrelli and Ruggieri 1965). The origin of the lymphocystis virus in this specimen was not reported.

This is the first documentation of lymphocystis virus from a species of the family

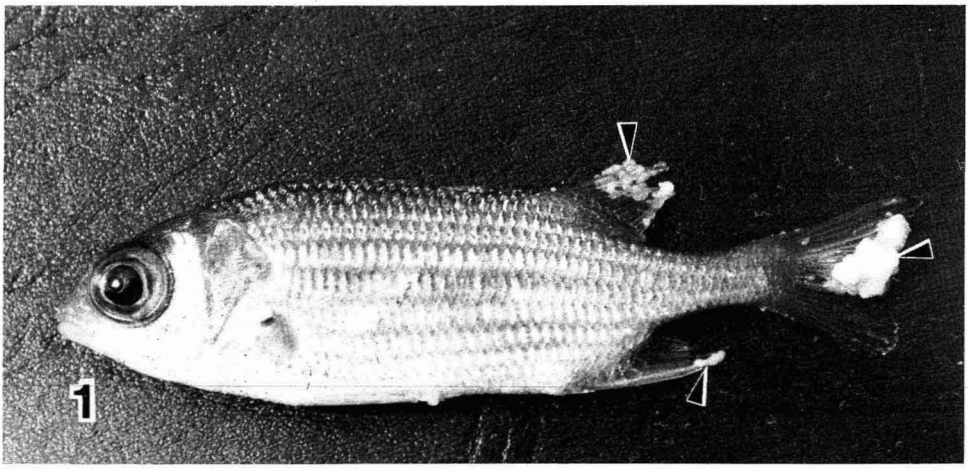

FIGURE 1. Lymphocystis nodules (arrows) of *Sargocentron punctatissimum* with lymphocystis virus disease.

FIGURE 2. Photomicrograph of lymphocystis-virus-infected cell from *Sargocentron punctatissimum*. Arrow indicates cytoplasmic inclusion. Hematoxylin and eosin stain. (Scale = 100 μm.)

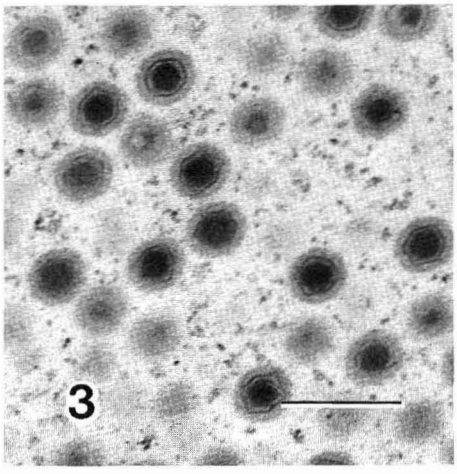

FIGURE 3. Electron photomicrograph of lymphocystis virus from *Sargocentron punctatissimum*. (Scale = 500 nm.)

Holocentridae collected and maintained in Hawaii, and the second documentation of lymphocystis in a fish from Hawaiian waters.

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